

CLAIMS:

1. An optical navigation device comprising:

5 a light source for illuminating a surface with a narrow bandwidth beam at an angle of illumination with respect to said surface; and
a detector positioned at an angle of reflection with respect to said surface operable to receive a reflected portion of said narrow bandwidth beam, wherein said angle of reflection is substantially equal to said angle of illumination.

10 2. The device of Claim 1 wherein said light source is a laser.

3. The device of Claim 2 wherein said laser is a VCSEL.

15 4. The device of Claim 1 wherein said light source is a narrow bandwidth LED

5. The device of Claim 4 wherein said narrow bandwidth LED is an edge emitting LED.

20 6. The device of Claim 1 further comprising a limiting aperture disposed between said light source and said surface.

7. The device of Claim 1 further comprising a narrow bandwidth filter positioned between said light source and said surface.

25 8. The device of Claim 1 wherein said detector array is a CMOS imager.

9. The device of Claim 1 further comprising a collimation lens to improve the light collection efficiency.

10. The device of Claim 1 further comprising an imaging lens positioned to be
5 operable to image said reflected portion of said narrow bandwidth beam onto said detector array.

11. A system for controlling a positional pointer on a video screen of a computer using a mouse to detect relative motion with respect to a surface, said system
10 comprising:

means for generating narrow bandwidth specular reflection images, each said narrow bandwidth scatter pattern being specific to a portion of said surface over which said mouse moves; and

means for converting said specific narrow bandwidth specular reflection
15 images into signals corresponding to relative motion between said mouse and said surface.

12. The system of Claim 11 wherein said generating means comprises a narrow bandwidth light source.

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13. The system of Claim 11 wherein said means for converting comprises a processor located within said mouse.

14. The system of Claim 11 wherein said surface is chosen from paperlike surface,
25 glossy type surface, painted surface and halftone surface.

15. The system of Claim 11 wherein said narrow bandwidth specular reflection images comprise surface features and interference features.

16. A method for determining relative motion between an optical navigation device
5 and a surface comprising:

providing a narrow bandwidth light beam at an angle of illumination with respect to said surface for illuminating said surface; and

receiving a reflected portion of said narrow bandwidth light beam at an angle of reflection with respect to said surface, such that said angle of reflection is

10 substantially equal to said angle of illumination.

17. The method of Claim 16 wherein said narrow bandwidth light beam is provided by a laser.

15 18. The method of Claim 16 wherein said reflected portion of said narrow bandwidth light beam is received by a detector array.

19. The method of Claim 16 further comprising generating an image signal in response to said reflected portion of said narrow bandwidth light beam.

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20. The method of Claim 19 further comprising a processor to receive said image signal and produce an output signal for controlling a positional pointer.